REMARKS

Upon entry of the present amendment, claims 1-3 will remain pending in the above-identified application and stand ready for further action on the merits.

The amendments made herein to claims 1 and 3 do not incorporate new matter into the application as originally filed, as they find support in the specification at page 17, line 4, to page 19, line 9.

Claim Rejections Under 35 USC § 102(b)

Claims 1-3 have been rejected under 35 USC § 102(b) as being anticipated by Yamaki et al. (EP 0 826 477 A2). Reconsideration and withdrawal of this rejection is respectfully requested based upon the following considerations.

Distinctions over Yamaki et al.

The distinctions between the present invention and Yamaki et al. are summarized in the following table.

	Present Invention	***Yamaki et al.***
Mold cavity before injection	Pressurization with carbon dioxide is not necessary.	Pressurized with carbon dioxide.
Molten resin to be injected	Preliminarily contains carbon dioxide dissolved therein.	No particular description.
Flow front of resin	Allowed to foam.	The surface layer of the flow front absorbs carbon dioxide. Only the surface layer comes to have lowered solidification temperature.
Resin pressure	After injection, pressure is applied to suppress foaming.	It is desired to apply a sufficient pressure to the resin in the cavity until the surface of the molded article is solidified.
Effect	Facilitating resin filling to thin-walled part.	Improving surface transferability and enabling a longer flow distance.

The USPTO asserts that Yamaki et al. teaches all of the features of present claim 1, i.e., a method of injection molding of a thermoplastic resin, comprising filling a mold cavity with a molten resin, having at least 0.2 wt% of carbon dioxide dissolved therein to lower its melt viscosity, while allowing the molten resin to foam at the flow front thereof, and then pressurizing the resin in the mold cavity to at least a pressure at which the resin does not foam.

Against the USPTO's assertion, Applicant's note the following points.

Yamaki et al. is directed to a technique of pressurizing a mold cavity with carbon dioxide, filling a resin into the pressurized mold cavity, and then applying a sufficient pressure to the resin in the cavity until the surface of the resulting molded article is solidified. During the resin-filling step, carbon dioxide preliminarily introduced in the mold cavity is dissolved in a very surface layer of the resin and reduces the solidification temperature of that portion. After the resin-filling step, a sufficient pressure is applied in order for pressing the resin surface to the mold surface, attempting to faithfully transfer the state of the mold surface to the resin.

Generally, if a mold cavity is pressurized with a gas prior to the resin-filling step, the pressure required for filling a resin becomes higher by that pressure of the gas preliminarily introduced. Therefore, this makes it apparently harder for the resin filling and suppresses foaming of the resin at the flow front in the case of using a foaming resin.

The disclosure of Yamaki et al., at page 4, lines 26-35, is directed to some details of the fountain flow in injection molding. It is also taught that when the resin is filled in the mold cavity after the cavity is filled with a specific gas such as carbon dioxide, the gas is absorbed into the flow front of the flowing

resin or enters into the interface between the mold and the resin and is dissolved in the surface layer of the resin; and that the gas dissolved in the resin selectively reduces the solidification temperature of only the resin surface.

In the disclosure of Yamaki et al., at page 5, lines 42-44, the minimum gas pressure for pressurizing the mold cavity is specified.

Example 1 on page 9 discloses a process in which a mold cavity is pressurized with carbon dioxide at 5 MPa and then filled with HIPS not preliminarily containing any carbon dioxide, followed by further application of pressure and solidification.

Thus, the present invention is not anticipated by the foregoing descriptions in Yamaki et al.

At page 5, lines 57-58, and page 6, lines 1-8, Yamaki et al. mentions that when a dot-like dented configuration on the mold surface is transferred, it is necessary to press the resin to the mold against the gas pressure in the dents, and in such a case, it is desired to perform the molding under a resin pressure higher than in the usual molding pressure. However, this statement is merely directed to the surface transferability and does not provide any teaching with regard to foaming. (Although, there can be seen a mention of "no bubble" in page 6, line 7, this statement is directed to release of the dissolved gas from the resulting molded article and hence is not really relevant to foaming.)

Regarding claim 2, the USPTO asserts that Yamaki et al. also discloses the feature of using a molten resin having dissolved therein carbon dioxide in an amount of not more than 0.3 wt%/MPa with respect of the pressure supplied carbon dioxide that is used. Herein, the USPTO assumes that the dissolved weight percent of carbon dioxide was 0.3 wt% taken from page 5, lines 42-54 and that the carbon dioxide pressure was 2 MPa taken from an example listed in Table 1.

Applicant would like to note the following points against the USPTO's assertion and assumption.

In the disclosure of Yamaki et al., at page 5, lines 42-54, the pressure of carbon dioxide at the time of pressurizing the mold cavity is specified. It is indicated therein that the lower limit of the pressure is a pressure under which the gas is dissolved in an amount of 0.1 wt, preferably 0.5 wt% in the resin in order to sufficiently reduce the solidification temperature, and that the problems such as sealing of the mold can be minimized so long as the pressure is 15 MPa or lower, preferably 10 MPa or lower.

Contrary, claim 2 is directed to limiting the resin to those that reduce their viscosities even with a small amount of carbon dioxide dissolved therein. This feature is for maximally exercising the effect of improving resin flowability owing to carbon dioxide.

Yamaki et al. does not provide any information concerning the selection of the resin.

Furthermore, the invention of claim 2 is also distinct from the disclosure of Yamaki et al. for the same reasons as set forth above in connection with claim 1.

Regarding claim 3, the USPTO asserts that Yamaki et al. also disclose the amount of the carbon dioxide dissolved in the molten resin being not more than 10 wt%.

In the disclosure of Yamaki et al. at page 5, lines 42-44 referred to by the USPTO, the pressure of carbon dioxide at the time of pressurizing the mold cavity is specified. It is indicated therein that the lower limit of the pressure is a pressure under which the gas is dissolved in an amount of 0.1 wt%, preferably 0.5 wt% in the resin in order to sufficiently reduce the solidification temperature. This disclosure is to specify the preferred dissolution amount for improving the transferability.

Contrary, claim 3 specifies the upper limit amount of carbon dioxide that is preliminarily dissolved in the molten resin for improving flowability. Yamaki et al. does not teach or suggest this requirement.

Furthermore, the invention of claim 3 is also distinct from the disclosure of Yamaki et al. for the same reasons as set forth above in connection with claim 1.

CONCLUSION

Based upon the above considerations, it is clear that each of pending claims 1-3 are not anticipated by, nor rendered obvious by, the disclosure of Yamaki et al. Accordingly, withdrawal of the outstanding rejections is required at present.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact John W. Bailey (Reg. No. 32,881) at the telephone number below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

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